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12

RECRUITERS, QUOTAS, AND THE NUMBER OF ENLISTMENTS

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The effects on the number of Navy enlistments of recruiters, their distribution, and their quotas are investigated. Published census data on the population and on the demographic and economic characteristics of Navy Recruiting Districts, and regression analysis, are used to control for differences in enlistment potential across districts. Results for CY 1973 and FY 1975 are compared. Improvements to the quota-setting process are considered.

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1. The Enlisted Tracking Study, reported by reference (a), contained as a separate tasking measuring differences in Navy Recruiting District productivity. To address this tasking, the Recruiters, Quotas and the Number of Enlistments Study, enclosure (1), examines the relationship between enlistments on the one hand and, on the other, the demographic characteristics of Navy recruiting districts and Recruiting Command Policy. It was designed to develop techniques for evaluating recruiter and recruiting district performance, and allocating recruiters and quotas across districts.

2. The study concludes that easily developed measures of the district population and its characteristics, together with variables describing the quota and the number of recruiters in each district, explain about 90 percent of the variation in enlistments across districts. Thus, in principle, a model of recruiting performance should be easy to construct. However, the historical census data used to construct the model has some shortcomings when used for this purpose. Current census data should be used when applying the methodology.

3. Technical problems with the model and data used in the study, namely correlation (or "multicollinearity") among the explanatory variables, dictate that the major findings be interpreted with caution. These problems are discussed on pages 12-13 of the text. In particular the interpretation that the marginal effect of recruiters is small is very much open to question. Other studies have found a greater incremental effect of Navy recruiters on enlistments and the contrary results have not been reconciled.

4. The study also concludes that effective quotas inhibit the productivity of recruiters in terms of the number of school eligible high-school-graduate enlistments attained.

It recommends that quality requirements be varied across districts to lessen this effect. While this finding is intuitively valid, it is subject to the same technical problems noted above.

5. The study should be viewed as a demonstration of a useful methodology for allocating recruiters or quotas across recruiting districts.

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Director
Navy Program Planning

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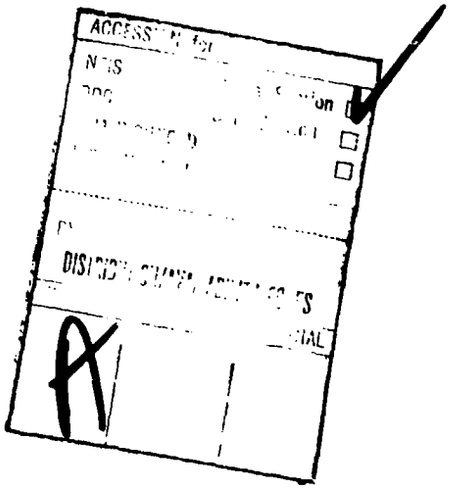

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SUMMARY

The end of the military draft in January 1973 occasioned a near doubling of the Navy's recruiting effort between FY 1971 and FY 1974. It also heightened concern about high attrition among first-term enlistees. An earlier CNA study found that high school graduates who were eligible to attend Navy technical schools are least likely to be prematurely discharged, and thus, on these grounds, are the most desirable enlistees. This study asks whether Navy recruiting policy can significantly affect the number of enlistments by these school-eligible high school graduates (SEHSGs). In particular, do the number of recruiters, their distribution, or their recruiting quotas significantly affect the number of SEHSG enlistments?

To answer this question, we relate the number of enlistments in Navy Recruiting Districts (NRDs) in CY 1973 and FY 1975 to the number of recruiters and the size of the quota. We use regression analysis to control for differences in economic and demographic characteristics across NRDs. Our data are drawn from published census sources and Navy recruiting statistics.

Our results are consistent across the two years and are invariant with respect to our choice of functional form for the enlistment model. We find that recruiters have very little effect, *at the margin*, on the number of enlistments in a NRD. This does not mean that recruiters have no effect on enlistments. However, it does mean that modest changes in the number of recruiters should have little effect on the number of enlistments.

We also find that the district quota inhibits the productivity of recruiters and thus limits the number of high quality (SEHSG) enlistments in a district. Given the necessity for quotas to maintain Navy control over total enlistments, quality requirements should be varied across NRDs to lessen this effect.

Analysis of the sort we performed is best suited for this purpose. However, the data used in this study are not. Our results should be viewed as a demonstration of a useful methodology for setting quotas. This methodology will be most useful and practical when the Navy has easy, automated access to current data (rather than the historical data used here) on the population and its demographic and economic characteristics across NRDs. Such data currently exists and the Department of Defense is considering acquiring it for the use of all the services. We strongly recommend that such acquisition be made.

This data set would serve other purposes than setting NRD-specific quality requirements. Estimates of the population of "Qualified Military Availables" (QMA) will become increasingly unreliable as time passes. Applying our analytical techniques to the recommended data would eliminate the need for QMA estimates. It would also provide the means for evaluating recruiting performance and give greater insight into the recruiting process.

INTRODUCTION

The end of the military draft in January 1973 result in a significant change in the military services' recruitment activities. When the draft provided a nearly unlimited source of manpower, the services' recruiting activities were minimal and first-term pay was considerably below that offered in the private sector. To prepare for the end of the draft, first-term pay was substantially increased in the fall of 1971. The services also responded to the anticipated draft-free environment with large increases in recruiting budgets and in the number of recruiters (or "canvassers"). Between FY 1971 and FY 1974, the Navy's total recruiting and advertising budget nearly doubled: from $53.4 to $104.1 million. Over the same period, the number of Navy recruiters increased 75 percent (from 2,034 to over 3,500).

The end of the draft also heightened concern about high attrition among first-term enlistees. The Navy was concerned not only about the effects of these premature losses on training plans and fleet readiness, but also about their costs. In FY 1975, the average cost of getting one recruit to this first duty station following graduation from recruit training exceeded $3,000. Consequently, a related CNA study (reference 1) developed a model for predicting premature losses to be used for evaluating recruiting policy changes and screening potential enlistees. Simplifying its results somewhat, this study found that high school graduates who were eligible to attend Navy technical schools were the least likely to be prematureiy discharged from the Navy. In other words, school-eligible high school graduates (SEHSGs) were, on these grounds, the most desirable Navy enlistees.

This study asks whether Navy Recruiting Command (NRC) policy can significantly affect the number of these SEHSG enlistments. In particular, how important is the number of recruiters, and will either their geographical distribution or the quotas or goals they are given have an important effect on enlistments? We answer these questions using regression analysis of data obtained from several sources for CY 1973 and FY 1975.

We begin with a description of our data and a theoretical discussion of the recruiting process. We next present results based on CY 1973 recruiting experience, and then compare these to results based on FY 1975 recruiting. Our conclusions and policy recommendations follow.

DATA AND METHODOLOGY

The Recruiting Command divides the United States into Navy Recruiting Districts (NRDs), designated by the city in which the district headquarters is located. The individual NRDs are our units of observation. At the beginning of CY 1973, there were 41 districts, and some reorganization resulted in 43 districts when FY 1975 began. The districts range in geographical size from the New York district, which includes only New York City and several contiguous counties, to the Seattle district which includes most of Washington, northern Idaho, and the entire states of Montana and Alaska. The Los Angeles district is the most populous with over 14.1 million residents while Fargo, North Dakota is the least populous with only 1.3 million.

The boundaries of the individual NRDs are drawn such that the only geographical unit which remains intact is the county. From the 1970 Census of Population (reference 2), we aggregated counties into recruiting districts and calculated weighted averages for various population, employment, and income statistics. Thus, these "control" variables, which are described below, are all as of 1970. The number of enlistments from each NRD was obtained from the "SCAT" tape created from data reported to the Armed Forces Entrance and Examining Stations by the Navy. This tape also provided the entry test scores and educational attainment of each enlistee. The number of recruiters in each district and the enlistment quota or goal for each district was obtained from the Navy Recruiting Command.[1]

Our basic model postulates that the number of enlistments in a NRD, E, is a function of the control variables, population, and policy variables in the district:

$$E = f(\text{control variables, population, policy variables}). \quad (1)$$

CONTROL VARIABLES AND POPULATION ESTIMATES

We have used seven variables to control for economic or demographic differences in the individual NRDs. They are:

BLACK	– the proportion of the total district population that is black,
URBAN	– the fraction of the total district population living in urbanized areas and in places of 2,500 inhabitants or more outside urbanized areas (Census definition),
EDUCATION	– the median years of education for the total district population,
UNEMPLOYMENT	– the unemployment rate of the total civilian labor force,
INDUSTRIAL MIX	– the proportion of the total civilian labor force employed in manufacturing,
PER CAPITA INCOME	– district per capita income (in $000s),
NET MIGRATION	– the percent net migration into the district between 1960 and 1970.

[1] The data we used is listed in appendix B.

These variables were chosen because they are available on a county-by-county basis and we expect all of them to affect enlistments.[1] We expect these variables to standardize districts for differences in both the propensity to enlist among the eligible population and potential enlistees' ability to satisfy Navy entrance requirements. Since our purpose here is *not* to estimate a military labor supply function, we are not especially interested in the strength and direction of the effect these variables have on enlsitments. We do hope these control variables, together with our policy variables, explain a large fraction of the variation in enlistments across districts. Our results imply that they serve this control function well.

The percent of the population that is black (BLACK) was included as a control variable since there is ample evidence of racial differences in economic activities. We account for differences in employment and income elsewhere, but this variable is intended to pick up the expectation that blacks have different tastes or qualification rates for military service than do whites. Since historically the Navy has enlisted few blacks, due to the preferences of blacks or the Navy or both, we should expect larger black populations to be associated with *fewer* enlistments.

The fraction of the population living in urbanized areas (URBAN) serves as a measure of the ease of recruiting. Other things equal, the higher the degree of urbanization, the more contacts can be made by a given recruiter per time period. We thus expect that more urbanized populations will be associated with more enlistments.

The district educational level (EDUCATION) can be viewed as a proxy for the mental group distribution of the population. The higher the median educational attainment, the more individuals can be expected to pass the Navy entrance examinations. However, higher educational levels may imply broader and better civilian opportunities, so that higher educational attainment may be associated with lower enlistment rates. Hence, the net effect of the EDUCATION variable is uncertain.

The unemployment rate of the civilian labor force (UNEMPLOYMENT) indicates the lack of job opportunities available in the civilian sector. We had no data on unemployment levels among 17 to 21 year-old males. Unemployment rates for individuals in this age group are much higher than the national average, but our measure should be a good proxy for *relative* employment opportunities across districts. We therefore expect that higher values of UNEMPLOYMENT will be associated with more enlistments.

There are two interpretations which can be placed on the effect of the proportion of the labor force employed in manufacturing (INDUSTRIAL MIX). First, it could measure employment opportunities available for skilled and semi-skilled labor, in the sense that industry represents a non-college alternative for individuals desiring some form of training. On these grounds, higher values of this variable ought to be associated with fewer enlistments. Second, to the extent that labor in manufacturing industries is unionized, this variable could serve as a proxy for barriers to entry into the civilian labor force. This effect implies that higher values of INDUSTRIAL MIX ought to be associated with *more* enlistments. Thus, the effect of this variable is uncertain.

[1] See, for example, references 3, 4, 5, and 6.

Higher levels of per capita income (PER CAPITA INCOME) in a district should reflect better civilian opportunities and also imply lower attractiveness of the military compensation package. Higher PER CAPITA INCOME, then, should be associated with fewer enlistments.

Relatively high and positive levels of NET MIGRATION indicate rapid population growth in a district, the expansion of job opportunities, and higher incomes. Negative values for this variable would indicate the opposite: lack of sufficient jobs, lower incomes, and, hence, movement of population out of the district. Therefore, higher values for NET MIGRATION should imply *fewer* enlistments.

The most important single determinant of the number of enlistments from a district is the size of the pool from which enlistments can be drawn. We define this pool to be the number of 17- to 21-year-old males residing in the district. Our estimate of the eligible population is simply the product of the total male population in the district in 1970 (from the census data) and the fraction of the total U.S. male population in 1970 that had reached age 17 to 21 years in CY 1973 (or FY 1975). This means we are implicitly assuming that the age distribution of the male population in each district is the same.[1]

POLICY VARIABLES

In many respects, the activities of the Navy Recruiting Command are analogous to those of any nation-wide sales force. Recruiters ("salesmen") are placed in "territories," and are given support in the form of automobiles, local and national advertising, exhibits, and the like. Monthly quotas are set for the number of "sales" (enlistments) to be made. This analogy is not perfect, however. Unlike the sales force for an insurance firm or a manufacturing concern, the Navy's "sales force" cannot greatly exceed its quota. Because of the Congressionally-imposed limit on the total size of the Navy, enlistment levels which are too high can cause serious problems of personnel management. Even greatly exceeding quotas for one month, much less an entire year, can cause problems in terms of scheduling the training for new recruits, for example.

This suggests that the quotas recruiters are given, as well as the number of recruiters, may have a significant effect on the number of enlistments. The recruiters' support (in the form of advertising, travel expenses, and clerical help) may also affect the number of enlistments. Unfortunately, because of data limitations, we have been able to investigate only the effects of the number of recruiters and their quotas.

Recruiters

The recruiters the Navy distributes among the NRDs can be expected to influence the number of enlistments for two principal reasons. First, recruiters deliver information to potential recruits. Information about pay, fringe benefits, possible job assignments and the like may be more efficiently

[1] Because the black population is younger than the white population, we have actually calculated the eligible pool in a more complicated fashion. The 17- to 21-year-old fraction for each district is a weighted average of the national fractions for blacks and whites, with the weights being the proportions of the population in each district that are black and white, respectively. We are thus assuming the age distribution of males is constant across districts, *after correcting for differences in the racial mix*. We believe this assumption introduces only a very small error, but that is only a guess without access to census data more detailed than that available in published sources. We discuss this and other data problems below when we consider the implications of our analysis.

delivered by other means such as advertising. But the recruiter is also the potential enlistee's only direct contact with the Navy. As such, the recruiter's experiences, anecdotes, and descriptions of a Navy career represent important information which would be difficult to provide in any other fashion. Because this information is, for the most part, delivered on a one-to-one basis, we should expect the number of recruiters in a NRD to have a positive and perhaps sizable effect on the number of enlistments.

Recruiters also serve a screening and processing function. This involves conducting personal interviews, administering tests, and making background investigations. A larger number of recruiters in a district should allow this function to be performed more thoroughly, but it need not have any direct effect on overall enlistments. What is more likely, however, is that a larger number of recruiters should allow for improved quality of actual enlistees.

In short, we expect the number of recruiters to be an important determinant of the number of enlistments. For CY 1973, our measure of the number of recruiters is the total number of individuals doing active recruiting in each district. In that year, these numbers were determined by the Recruiting Command. In FY 1975, district commanders had more flexibility in determining the number of recruiters. They were given a fixed number of total personnel which they were free to allocate between the recruiting and support (administrative and clerical) functions. For FY 1975, then, we have two possible measures of the number of recruiters: total personnel, and the number of personnel assigned to recruiting, in each district.

A third measure is also available for FY 1975. On the assumption that recruiters increase in effectiveness as they gain in experience, the Recruiting Command has developed a measure of the number of recruiters which they term "factored" recruiters. It is the average number of recruiters, weighted by time on the job. Thus, for FY 1975 we have three measures of recruiter numbers: total recruiters, total personnel, and factored recruiters. For CY 1973 we are limited to one measure: total recruiters.

Quotas

The Navy Generally evaluates the performance of a NRD on the basis of whether its quota was met, and, to a lesser extent, on the basis of the degree to which it was exceeded. But recruiters know that if all NRDs were to exceed their quotas for a year, the Navy would face serious personnel management problems. We expect, then, that *effective* quotas limit the productivity of recruiters and thus affect the number of enlistments in a district.

For CY 1973 and FY 1975, our quota measure is simply the annual district goal for male non-prior-service regular enlistments to the active Navy. It thus excludes goals for officer and reserve enlistments and other special categories such as women and broken-service reenlistments.

FUNCTIONAL FORM

Table 1 lists the variables we used in regression analysis to explain the variation in the number of enlistments across districts. What is the appropriate functional form for estimating the relation

between these explanatory variables and our dependent variable, the number of enlistments? In earlier work (for example, references 3, 4, 5, and 6) two functional forms have been most commonly used. The first is the linear form,

$$ER_i = \alpha_o + \alpha_1 R_i + \alpha_2 Q_i + \sum_{i=1}^{7} \beta_j X_{ij} \quad (2)$$

where ER_i is the enlistment *rate* in the *ith* NRD which is equal to the number of enlistments, E_i, divided by the eligible population, P_i ($ER_i = \frac{E_i}{P_i}$); R_i is the number of recruiters; Q_i is the quota; the X_{ij} are the seven control variables listed in table 1; and α_o and α_1, α_2, and the β_j are a constant term and the coefficients to be estimated. Because the enlistment rate is a number between 0 and 1, the logistic (logit) functional form is theoretically more appropriate than the linear form, equation (2) (see references 7 and 8). The logit form is written

$$\ln \left(\frac{ER}{1 - ER}\right)_i = \alpha_0 + \alpha_1 R_i + \alpha_2 Q_i + \sum_{j=1}^{7} \beta_j X_{ij} \quad (3)$$

where $\ln \left(\frac{ER}{1 - ER}\right)$ denotes the natural logarithm of the quantity $\frac{ER}{1 - ER}$.

TABLE 1

EXPLANATORY VARIABLES

Control Variables (All as of 1970)

BLACK (Fraction of total population)
URBAN (Fraction of total population)
EDUCATION (Median years for total population)
UNEMPLOYMENT (Rate for total civilian labor force)
INDUSTRIAL MIX (Fraction of total civilian labor force in manufacturing)
PER CAPITAL INCOME ($000s)
NET MIGRATION (Net fraction into the district, 1960-70)

Population (17- 21-year-old males)

Policy Variables

RECRUITERS (CY 1973 and FY 1975)
TOTAL PERSONNEL (FY 1975 only)
FACTORED RECRUITERS (FY 1975 only)
QUOTA (Male non-prior-service regular enlistments)

Though equations (2) and (3) may be appropriate for estimating the effects of the control variables, they may not be appropriate for estimating the effects of recruiters and quotas. In particular, our discussion of the effects of canvassers and quotas, and economic theory, suggest several properties an appropriate functional form should have, and these considerations have influenced our choice of functional form.

Because of the processing and screening function of recruiters, as the number of recruiters approaches zero, the number of enlistments should also approach zero. That is, in the absence of recruiters, *other things remaining the same,* no one would be able to enlist in the Navy. As the number of recruiters rises, the number of enlistments should rise. Enlistments may rise nearly proportionately at first, but increases in the number of recruiters should eventually increase enlistments at a diminishing rate. Finally, when the number of recruiters is sufficiently large, additional (or marginal) recruiters should have little or no effect on enlistments. While an additional recruiter may not be able to induce any additional enlistments, he should not *discourage* any. Therefore we expect that increases in the number of recruiters should never decrease the number of enlistments. In short, we expect the marginal recruiter's contribution (the marginal product of recruiters) to be greater than or equal to zero, and diminishing with increases in the number of recruiters.

Because of the evidence presented here and in other studies of enlistment behavior, it is reasonable to assume that the effect of recruiters should depend on the economic and demographic characteristics of the NRD. In districts where potential recruits have a high propensity to enlist, additional recruiters should increase enlistments more than in NRDs where the propensity to enlist is lower.

By the same token, the effect of increased quotas should also depend on the characteristics of the NRD and the level of the quota. Starting from zero, increases in quotas should initially be accompanied by one-for-one increases in enlistments. But, as the enlistment potential of a district is more completely exploited, increases in the quota should elicit less than proportional increases in enlistments. Indeed, if quotas are high enough, further increases in quotas might so discourage recruiters as to lead to a *fall* in enlistments.

We considered a number of functional forms that possess the properties described above. Two forms consistently outperformed the others in terms of statistical criteria such as goodness-of-fit. They were the logit function (equation (3)) and a functional form we have termed "log-interaction." It is described below. The linear form (equation (2)) did not perform as well, and it does not satisfy several of the criteria outlined above. For example, it assumes the marginal product of recruiters is constant across districts or levels of recruiters.

In what follows, we present results based on estimates of the following two functional forms:

Logit function,

$$\ln\left(\frac{ER}{1-ER}\right)_i = \alpha_0 + \alpha_1\left(\frac{R}{P}\right)_i + \alpha_2\left(\frac{Q}{P}\right)_i + \sum_{j=1}^{7} \beta_{ij} X_j \qquad (4)$$

Log-interaction function,

$$\left(\frac{E}{\lambda}\right)_i = \alpha_1 \ln\left(\frac{R}{\lambda}\right)_i + \alpha_2 \left(\ln\frac{R}{\lambda}\ln\frac{Q}{\lambda}\right)_i + \sum_{j=1}^{7} \beta_j \left(\ln\frac{R}{\lambda}\ln\frac{Q}{\lambda}\right)_i X_{ij} \qquad (5)$$

where λ_i is a measure of the size of the NRD equal to the district's population divided by the average population for all districts $\left(\lambda_i = \frac{P_i}{\bar{P}}\right)$.

Equation (4) differs from equation (3) in that R_i and Q_i are divided by the district eligible population, P_i. This form performed better than equation (3) and also is more intuitively appealing. It says that the size of R and Q, *relative* to population, is important, rather than the absolute levels of R and Q.

Our reasons for reporting results only for equations (4) and (5) are several. The logit function, equation (4), is the most justifiable form on theoretical grounds. Consequently, we report our estimates of the logit function in the context of any qualitative discussions of our results. We do not believe, though, that the form of the logit function adequately captures the relationship between our two policy variables, RECRUITERS and QUOTA, and the number of enlistments. Of all the forms we investigated, the logit function resulted in the lowest estimates of the marginal product of recruiters. Further, of those forms that allowed the marginal product of recruiters to vary as the number of recruiters varies, the logit function had the "flattest" marginal product curve. That is, large variations in the number of recruiters had virtually no effect on the marginal product of recruiters. On the other hand, the log-interaction form, equation (5), yielded higher and, in our judgement, more credible estimates of the marginal product of recruiters. It also showed a more plausible variation in the marginal product of recruiters as the number of recruiters varied. Other forms that yielded higher estimates of the marginal product of recruiters than did the logit function,[1] implied marginal product curves that were too "steep." In other words, small variations in the number of recruiters lead to implausibly large variations in the marginal product of recruiters.

In short, no one functional form was "perfect" in the sense that it both satisfied the criteria described above and gave intruitively plausible results. The logit function, equation (4), is theoretically most appropriate, but the log-interaction form, equation (5), yielded the most reasonable results.

[1] For example, a form quadratic in the number of recruiters:

$$E_i = \alpha_0 R_i + \alpha_1 R_i^2 + \alpha_2 R_i P_i + \sum_{j=1}^{7} \beta_j R_i X_{ij}.$$

RESULTS

CY 1973 LOGIT REGRESSIONS

Table 2 presents the results of estimating the logit enlistment model (equation (4)) for total enlistments in CY 1973. A t-value greater than 1.68 means the coefficient is significantly different from zero at the 90 percent level; a value of 2.02 means significance at the 95 percent level. The elasticity of the enlistment rate with respect to changes in the explanatory variables is calculated at the means as follows:

$$\text{Elasticity}_j = \overline{X_j}\ \overline{(1 - ER)}\ \hat{\beta}_j$$

where the X_j are the explanatory variables, ER is the enlistment rate, and the $\hat{\beta}_j$ are the estimated coefficients. The bars indicate that the variables are measured at their means. The interpretation of an elasticity is the percent response of the dependent variable (the enlistment rate) to a one percent change in the explanatory variable. For example, the regression results in table 2 say that a one percent change in the fraction of the district population that is black is associated with a 0.09 percent change, in the opposite direction, of the enlistment rate.

The results in table 2 are interesting for several reasons. First, the R^2 of .88 means the explanatory variables "explain" 88 percent of the variation in enlistment rates across districts. In other words, our control and policy variables do in fact explain the large majority of the variation in enlistments, as we hoped they would.

TABLE 2

REGRESSION RESULTS FOR LOGIT ENLISTMENT MODEL
TOTAL ENLISTMENTS, CY 1973

Explanatory variable	Coefficient	t-value	Elasticity
Constant	-2.31	-2.55	
BLACK	-0.77	-2.80	-0.09
URBAN	0.47	2.49	0.32
EDUCATION	0.048	0.89	0.55
UNEMPLOYMENT	1.46	1.04	0.06
INDUSTRIAL MIX	0.58	2.22	0.14
PER CAPITA INCOME	-0.33	-3.53	-0.96
NET MIGRATION	0.37	1.76	0.01
RECRUITERS	292.4	0.76	0.11
QUOTA	0.57	4.46	0.56

n = 41
R^2 = .88
F = 24.4

Second, many of the coefficients have a high level of statistical significance. The coefficient on BLACK is negative and strongly significant, indicating that in districts that are more populated by blacks, the Navy obtains fewer enlistments. This no doubt reflects the lower likelihood that blacks will pass Navy entrance exams, relative to whites. But it may also reflect a distaste for the Navy on the part of blacks, or the reverse. These issues are addressed in greater detail in appendix A.

The URBAN variable is also strongly significant. It is positive, suggesting that urbanized areas are more fruitful for recruiting. This is not surprising, since, as we argued earlier, recruiting should be more efficient in urban areas than in less populated areas.

The coefficients on EDUCATION and UNEMPLOYMENT are not statistically significant. This means that neither average educational attainment nor the unemployment rate in a district is strongly associated with the enlistment rate.

As expected, PER CAPITA INCOME has a significant negative effect on the enlistment rate. This means that areas of relatively low income per capita provide more enlistments than do wealthier areas.

The significant positive coefficients on INDUSTRIAL MIX and NET MIGRATION are difficult to interpret. We had no prior expectation about the direction of effect INDUSTRIAL MIX should have, so the positive sign lends support to the hypothesis that it may serve as a measure of the barriers to entry into the civilian labor force represented by the high degree of unionization in the manufacturing sector. In the case of NET MIGRATION, however, we had argued that we expected a negative sign. The explanation for the positive sign may lie with our estimates of the eligible population, P, in each district. These estimates are ultimately based on population as of 1970. If, however, migration patterns during the 1960s have persisted into the 1970s, then our population estimates will be low for NRDs with net in-migration, and high for NRDs with net out-migration. This in turn means high values of NET MIGRATION will be associated with higher than expected (on the basis of the other control variables) *measured* enlistment rates, while low (negative) values of NET MIGRATION will be associated with low *measured* enlistment rates. This line of reasoning would then explain the positive coefficient on NET MIGRATION.

In any event, the reason for a particular sign or magnitude of the coefficients on the control variables is not of any special importance here. What is important is that these variables sufficiently correct for economic and demographic differences across districts, so that our estimates of the effects of recruiters or quotas are not biased. As we argued earlier, we believe they do.[1]

[1]We also included two other variables, in addition to those already mentioned, in our preliminary regressions. The first of these was the number of enlistments to the other three services from each NRD. Including this variable usually led to a slight improvement in the explanatory power of the regression. The coefficient always had a negative sign (meaning that the Navy achieves greater enlistments at the expense of the other services), and it was often statistically significant. We have sacrificed this additional explanatory power, however, because our methodology should be used to predict *future* enlistments (rather than explain *past* enlistments), and future enlistments to the other services are unknown.

We also speculated that at least one other variable might influence enlistment rates or the effect of recruiters on enlistments. Other things equal, the larger the land area of a district, the more difficult might recruiting be. More densely populated NRDs (those with less area, holding population constant) would allow recruiters to make more contacts per time period and thus presumably generate greater enlistments. However, when land area (or its square root) was entered as an explanatory variable in our regressions, its coefficient was always insignificant, and often had an incorrect sign.

This counter-intuitive result is probably due to several factors. First, our URBAN variable may capture much of the expected population density effect. Second, regardless of the overall population density in a district, the population is not distributed evenly throughout the district. Recruiters are distributed *within* a district to take advantage of this fact. Thus the average population density in the district is of little importance.

The coefficient on RECRUITERS is positive, as expected, but it is not statistically significant. The elasticity of 0.11 implies that a 10 percent increase in the number of recruiters in a district would lead to only a 1.1 percent increase in the number of enlistments. The coefficient on QUOTA is also positive, meaning that higher quotas are associated with higher enlistment rates. This result has a high degree of statistical significance. The elasticity of 0.56 means that an increase of 10 percent in the quota will lead to a 5.6 percent increase in the enlistment rate.

Before any conclusions are drawn from the results in table 2, several objections can be raised. First, and most important, it is not clear what the results in table 2 reflect. The observed number of enlistments from each district is not merely a function of potential recruits' propensity to enlist. It is also a function of the Navy's quality restrictions. That is, the Navy does not accept *all* individuals who wish to enlist, but only those who meet minimum quality requirements. Further, these minimum quality requirements vary with the Navy's demand (requirements) for enlistments. Thus the regression in table 2 does not represent merely the enlistment propensity of the district population (analogous to a pure supply function), but also represents the Navy's demand for enlistments.

Second, it might be argued that the significant positive coefficient on QUOTA is merely an arithmetic result. That is, higher quotas lead to more enlistments because recruiters merely lower standards in order to meet those higher quotas.

Both of these objections are addressed by estimating a regression where the dependent variable (the enlistment rate) is more narrowly defined to include only enlistees who are both eligible for Navy Schools and high school graduates. This regression will be more analogous to a pure supply function since the Navy will accept virtually all volunteers who are school-eligible high school graduates (SEHSGs). For the same reason, the size of the district quota should have no effect on the number of SEHSG enlistments, since no district comes even close to recruiting exclusively SEHSGs. However, if the quota has the disincentive effect we have argued it might have, then QUOTA should still be positively related to the enlistment rate: higher quotas leading to more enlistments and lower quotas resulting in fewer enlistments.

Table 3 presents the results of estimating the logit enlistment model for SEHSG enlistments in CY 1973. These results are very similar to those in table 2. Nevertheless, there are some interesting differences. First, note that the quality of the regression itself has increased, as evidenced by the higher R^2 and F-ratio. Second, none of the control variables has changed sign. However, URBAN and INDUSTRIAL MIX are no longer significant, while EDUCATION and UNEMPLOYMENT, which were both insignificant in the total enlistment regression, are now both strongly significant. The other control variables, BLACK, PER CAPITA INCOME, and NET MIGRATION, have virtually the same effect on SEHSG enlistments that they do on total enlistments. As before, though, we are not especially interested in what insights the effects of the control variables may give us into enlistment behavior. Rather, we only want them to control for differences across NRDs that might otherwise bias our estimates of the effects of quotas and recruiters.

TABLE 3

REGRESSION RESULTS FOR LOGIT ENLISTMENT MODEL SCHOOL-ELIGIBLE HIGH-SCHOOL-GRADUATE ENLISTMENTS, CY 1973

Explanatory variable	Coefficient	t-value	Elasticity
Constant	-4.75	-4.48	
BLACK	-1.35	-4.16	-0.15
URBAN	0.13	0.60	0.09
EDUCATION	0.24	3.81	2.75
UNEMPLOYMENT	7.03	4.27	0.30
INDUSTRIAL MIX	0.12	0.40	0.29
PER CAPITA INCOME	-0.42	-3.83	-1.22
NET MIGRATION	0.47	1.90	0.01
RECRUITERS	306.3	0.68	0.12
QUOTA	0.58	3.82	0.56

n = 41
R^2 = .93
F = 48.9

More interesting then, than the differences in the effects of the control variables, is the stability of the effects of the RECRUITERS and QUOTA variables. The coefficient on RECRUITERS remains positive, but insignificant. Ordinarily, this insignificance could be interpreted to mean we cannot reject the hypothesis that the "true" coefficient on RECRUITERS is zero. However, this interpretation is not warranted here. The RECRUITERS variable is highly correlated with the QUOTA variable and with the other explanatory variables.[1] This correlation (or "multicollinearity") among the explanatory variables does not bias the size of the estimated effect of these variables (the coefficients and elasticities in table 3). But, it does bias downward the estimated t-values. Thus, the "true" t-value on the RECRUITERS variable is probably greater than the 0.68 shown in table 3. In other words, the low t-value on RECRUITERS is probably the result of multicollinearity, and *not* necessarily the result of recruiters being unimportant.

In any case, our results do not mean that recruiters have no effect on enlistments. What they do mean is that given the numbers of recruiters on the job in CY 1973, variation across NRDs in the number of recruiters may explain little or none of the variation in enlistments across NRDs.

Another way of looking at this issue is to ask what the effect would be of additional or marginal recruiters in a NRD. The elasticity of 0.12 implies a 10 percent increase in the number of recruiters would lead to only a 1.2 percent increase in enlistments. The results in table 3 can also be

[1] For example, the simple correlation between the RECRUITERS and QUOTA variables varies between 0.85 and 0.95, depending on the definitions of the variables.

used to calculate the marginal product of recruiters, $\frac{\Delta E}{\Delta R}$. When evaluated at the means of the explanatory variables (the "average" NRD), the marginal product of recruiters is only 1.19. That is, adding one recruiter to the average NRD yields somewhat more than one (1.19) additional school-eligible high-school-graduate enlistment per year. In short, recruiters appear to have very little effect on the number of enlistments, *at the margin.*

This result may seem surprising, but there are good reasons to believe it is a correct one. First, the *average* product of recruiters is not very high. In CY 1973, the 41 NRDs had a total of 3,589 recruiters and SEHSG enlistments totaled 35,767. This implies an average produce of only 9.96 (= 35,767/3,589) SEHSG enlistments per recruiter.[1] Given this low average product, our estimate of the marginal product does not seem unlikely.

Second, our results are not particularly sensitive to the functional form of the enlistment function. As will be seen below, estimates of the marginal product from the log-interaction form (equation (5) above) were only about twice those given above, or about 2 and 4 for SEHSG and total enlistments, respectively. For other forms we tried, that also allowed the marginal product to vary across NRDs or levels of recruiters, the estimate of the marginal product for SEHSG enlistments was always below 4.0.

In short, the marginal product of recruiters in terms of SEHSG enlistments is almost certainly less than 4.0. Our best point estimates suggest that it lies around 2.0. We have even more confidence in our qualitative conclusion – that the marginal product of recruiters is positive, low, and diminishes with increases in the number of recruiters – than we do in these quantitative estimates. Both the logit and log-interaction forms constrain the marginal product of recruiters to be positive and diminishing (assuming a positive coefficient on RECRUITERS in the logit case). For functional forms which did not impose this constraint, the results were the same: the marginal product of recruiters is positive, low, and diminishes with increases in the number of recruiters.

Turning now to the effect of quotas, we see QUOTA has a significant positive coefficient in both the total and the SEHSG enlistment regressions (tables 2 and 3, respectively). We have argued that this is evidence that effective quotas limit the number of enlistments. It is possible that the positive relation between QUOTA and total enlistments is a simple arithmetic one. But, if quotas do not limit enlistments we should see no relation between QUOTA and SEHSG enlistments, since the Navy never recruits as many of these SEHSGs as it would like.

The positive relation between QUOTA and SEHSG enlistments might still not be surprising if the Recruiting Command "perfectly" allocates quotas, in the sense that the quota accurately reflects the expected number of enlistments in a district. However, we have been told by members of the Recruiting Command staff that this is not very likely. As an additional test, however, we ranked the 41 NRDs in our sample by percent of quota attained during CY 1973, and divided the sample into

[1]The average product for *total* enlistments in CY 1973 was 18.46. (The marginal product for total enlistments – based on results in table 2 – was 2.09.) However, these average products understate the recruiters' workload. They also have responsibility for recruiting broken-service reenlistments, women, reservists, and some other minor categories. With all accessions as the base, the average product in CY 1973 was 27.14.

two. NRDs in the upper half of this ranking were included in one sample, and those in the lower half in the other. We then reestimated some of our regressions for each sample separately. For NRDs which had been in the bottom half of the ranking, the recruiters' coefficient remained positive and was strongly significant. The recruiters' variable was statistically insignificant for the half of the sample which included those NRDs which were in the top half of the ranking. We interpret this as evidence that effective quotas do limit enlistments and inhibit the productivity of recruiters.

To summarize, our conclusions thus far are as follows: First, the marginal product of recruiters is positive, but it diminishes with increases in the number of recruiters. Second, this marginal product is quite low. Third, effective quotas limit enlistments and inhibit the productivity of recruiters.

CY 1973 LOG-INTERACTION REGRESSIONS

The next question to address is whether reallocating recruiters or quotas in 1973 would have significantly affected the number of enlistments in that year. In principle, the results in tables 2 and 3 could be used for this purpose. However, we use instead the results from a log-interaction regression, equation (5). As we argued earlier, the logit function implies a marginal product of recruiters that is, in our judgement, implausibly low. It also implies a marginal product curve that seems too flat. On the other hand, of all the functional forms we investigated, the log-interaction form gave the most intuitively reasonable results for both the marginal product of recruiters and the way the marginal product varies with changes in the number of recruiters. Thus, we use the results from the log-interaction form here.

Table 4 presents results for the log-interaction regression for SEHSG enlistments. Recall that the seven control variables are here multiplied by the quantity, $\ln(R/\lambda)\cdot\ln(Q/\lambda)$. No coefficient or t-value is shown for RECRUITERS or QUOTA because the interaction form means their effect is not measured by any single coefficient.

The t-values and elasticities for the log-interaction form (table 4) are compared in table 5 to those from the logit form (table 3). The two functional forms produce essentially the same results. Among the control variables, only the effect of URBAN and INDUSTRIAL MIX differ markedly between the two regressions. However, neither variable is significant in either regression. The QUOTA variable also has essentially the same effect.

Only for the effect of recruiters do the two functional forms estimate markedly different effects. The elasticity of enlistments with respect to recruiters from the log-interaction form is twice that from the logit form.

The results in table 4 can be used to calculate the marginal product of recruiters. Recall that table 4 is the result of an estimate of equation (5):

$$\left(\frac{E}{\lambda}\right)_i = \alpha_1 \ln\left(\frac{R}{\lambda}\right) + \alpha_2 \left(\ln\frac{R}{\lambda}\ln\frac{Q}{\lambda}\right)_i + \sum_{j=1}^{7} \beta_j \left(\ln\frac{R}{\lambda}\ln\frac{Q}{\lambda}\right)_i X_{ij} \qquad (5)$$

Then the marginal product of recruiters in the *ith* NRD is:

$$\left(\frac{\partial E}{\partial R}\right)_i = \left(\frac{\lambda}{R}\right)_i \left[\alpha_1 + \alpha_2 \left(\ln\frac{Q}{\lambda}\right)_i + \sum_{j=1}^{7} \beta_j \left(\ln\frac{Q}{\lambda}\right)_i X_{ij}\right] \qquad (6)$$

Equation (6) can be evaluated for each NRD.

TABLE 4

REGRESSION RESULTS FOR LOG-INTERACTION ENLISTMENT MODEL, SCHOOL-ELIGIBLE HIGH-SCHOOL-GRADUATE ENLISTMENTS, CY 1973

Explanatory variable	Coefficient	t-value	Elasticity
BLACK	-30.6	-3.11	-0.13
URBAN	- 1.47	-0.23	-0.04
EDUCATION	6.50	3.54	2.94
UNEMPLOYMENT	186.4	3.99	0.32
INDUSTRIAL MIX	- 3.95	-0.48	-0.04
PER CAPITA INCOME	- 8.80	-2.62	-1.00
NET MIGRATION	11.0	1.45	0.01
RECRUITERS			0.22
QUOTA			0.49

n = 41
R^2 = .92
$\bar{R}^2$ = .89
F = 412.8

TABLE 5

COMPARISON OF LOGIT AND LOG-INTERACTION RESULTS, SCHOOL-ELIGIBLE HIGH-SCHOOL-GRADUATE ENLISTMENTS, CY 1973

	t-value		Elasticity	
Explanatory variable	Logit	Log-interaction	Logit	Log-interaction
BLACK	-4.16	-3.11	-0.15	-0.13
URBAN	0.60	-0.23	0.09	-0.04
EDUCATION	3.81	3.54	2.75	2.94
UNEMPLOYMENT	4.27	3.99	0.30	0.32
INDUSTRIAL MIX	0.40	-0.48	0.29	-0.04
PER CAPITA INCOME	-3.83	-2.62	-1.22	-1.00
NET MIGRATION	1.90	1.45	0.01	0.01
RECRUITERS	0.68		0.12	0.22
QUOTA	3.82		0.56	0.49

Since we will also use equation (6) to calculate the effects of optimally distributing recruiters across NRDs in CY 1973, we will not use the results in table 4. Instead, we will use the results from the regression which yields the best predictions of enlistments. That is the regression with the lowest standard error of estimate (or, the highest adjusted R^2, $\bar{R}^2$).[1] The results from that "best" regression are displayed in table 6. Note that the results in table 6 are virtually the same as the results in table 4, but the overall quality of the regression has improved. While the elasticities are essentially unchanged, all the t-values on the included explanatory variables are higher, and the adjusted R^2 ($\bar{R}^2$) has risen from .89 to .90. The regression in table 6 does not include URBAN or INDUSTRIAL MIX, since their inclusion does not improve the predictive power of the regression.

Using the results in table 6 and equation (5), we can calculate the marginal product of recruiters in each NRD. When evaluated at the means of the explanatory variables (the "average" NRD), the marginal product of recruiters is only 2.20. That is, adding one recruiter to the average NRD yields somewhat more that 2 (2.20) additional SEHSG enlistments per year. (Recall that this is slightly less than twice the estimate of 1.19 based on the logit regression in table 3.) For individual NRDs, the marginal product of recruiters ranges from a low of 1.29 to a high of 2.90. To repeat our earlier conclusion, recruiters appear to have very little effect on the number of enlistments, at the margin.[2]

TABLE 6

"BEST" REGRESSION RESULTS FOR LOG-INTERACTION ENLISTMENT MODEL, SCHOOL-ELIGIBLE HIGH-SCHOOL-GRADUATE ENLISTMENTS, CY 1973

Explanatory variable	Coefficient	t-value	Elasticity
BLACK	-32.39	-3.68	-0.14
EDUCATION	6.73	4.02	3.05
UNEMPLOYMENT	189.1	4.19	0.32
PER CAPITA INCOME	-9.88	-4.16	-1.12
NET MIGRATION	12.51	1.94	0.01
RECRUITERS			0.22
QUOTA			0.48

n = 41
R^2 = .92
$\bar{R}^2$ = .90
F = 559.8

[1] The R^2 and $\bar{R}^2$ are related as follows:

$$\bar{R}^2 = R^2 - \frac{k}{n-k-1}(1-R^2)$$

where n is the number of observations and k is the number of explanatory variables (not including the constant).
[2] For total enlistments, the log-interaction form estimates a marginal product of 4.09. The logit estimate was 2.09.

The low marginal product of recruiters has several implications. First, distributing recruiters optimally across NRDs would not lead to a significantly greater number of enlistments:[1] With the actual distribution of recruiters in CY 1973, the regression reported in table 6 predicted a total of 35,700 SEHSG enlistments (the actual total was 35,767). With the CY 1973 recruiter force distributed optimally across NRDs, predicted enlistments were only 35,800, or an increase of only three-tenths of one percent. Second, modest reductions in the number of recruiters will not have a large effect on the number of enlistments or their quality.

The results in table 6 can also be used to calculate the marginal effects of quotas and the effect of redistributing them. The elasticity of 0.48 on QUOTA (table 6) means a 10 percent increase in the quota in a district on average leads to a 4.8 percent increase in SEHSG enlistments. We can also calculate the marginal effect of an increase in quotas, analogous to the marginal product of recruiters. When calculated for our hypothetical "average" district, the marginal effect of the quota is 0.24. That is, an increase of 100 in the quota leads to an increase of 24 SEHSG enlistments. When calculated for individual NRDs, the marginal effect of the quota in CY 1973 ranges between 0.13 and 0.54.

As in the case of recruiters, quotas can also be distributed optimally in the sense that the number of SEHSG enlistments will be maximized for a given level of the quota across all NRDs. Had quotas been optimally assigned in CY 1973, the Navy would have obtained about 1,000 more SEHSG enlistments, or an increase of about three percent.

We can now answer the question posed at the beginning of this section: Would reallocating quotas or recruiters in CY 1973 have significantly affected the number of enlistments in CY 1973? In the case of recruiters, the answer is no. Though there was a sub-optimal distribution of recruiters across NRDs in CY 1973, an optimal distribution would have had very little effect on the number of SEHSG enlistments. An optimal distribution of quotas, though, would have increased SEHSG enlistments about three percent.

FY 1975 RESULTS

The results presented above are based on recruiting in CY 1973, the first year the Navy was not benefiting from the inducement to enlist which the draft provided.[2] Thus, it can be argued that 1973 was a year of experimentation and learning for the services' recruiting forces. This argument suggests that the results presented above may have little reliability or relevance for current experience. To test this hypothesis, we estimated the logit and log-interaction enlistment models for FY 1975.

Our data for the control variables were identical to that used for the CY 1973 regressions. In other words, our control variables are still based on 1970 data. Reorganization by the Recruiting Command had increased the number of NRDs from 41 in CY 1973 to 43 at the beginning of FY 1975, but in every other respect the data were identical for the two years. Table 7 presents results for the logit enlistment model for SEHSG enlistments in FY 1975, and table 8 compares these results to those for CY 1973 (from table 3) in terms of t-values and elasticities.

[1] An optimal distribution of recruiters is one where the marginal product of recruiters (the increase in total enlistments due to an increase of one in the recruiter force) is equal for all NRDs. That satisfying this equality leads to an optimal allocation of recruiters can be seen from the following example. Assume there are only two NRDs: one where the marginal product of recruiters is 4, and a second where it is only 2. By removing one recruiter from the second NRD and assigning him to the first, enlistments in the first NRD rise 4, while those in the second NRD fall 2, for a net gain of 2 new enlistments (4 minus 2). This allocation of recruiters from the second NRD to the first should be continued until the marginal product is the same in both NRDs. The diminishing marginal product of recruiters assures us that this equality will eventually be satisfied. That is, as more recruiters are added to the first NRD, its marginal product will fall, while the marginal product in the second NRD will rise as recruiters are removed.

[2] The last draft calls were made in January 1973 and the legal authority for the draft expired at the end of June 1973.

TABLE 7

REGRESSION RESULTS FOR LOGIT ENLISTMENT MODEL, SCHOOL-ELIGIBLE HIGH-SCHOOL-GRADUATE ENLISTMENTS, FY 1975

Explanatory variable	Coefficient	t-value	Elasticity
Constant	-2.43	-1.77	
BLACK	-0.70	-1.99	-0.08
URBAN	0.27	1.00	0.18
EDUCATION	0.19	2.78	2.25
UNEMPLOYMENT	0.54	0.28	0 02
INDUSTRIAL MIX	-0.35	-1.00	-0.09
PER CAPITA INCOME	-0.43	-3.82	-1.26
NET MIGRATION	0.53	2.03	0.02
RECRUITERS	-374.8	-0.58	-0.14
QUOTA	0.83	4.07	0.83

n = 43
R^2 = .88
F = 26.8

TABLE 8

COMPARISON OF CY 1973 and FY 1975 LOGIT RESULTS, SCHOOL-ELIGIBLE HIGH-SCHOOL-GRADUATE ENLISTMENTS

	t-value		Elasticity	
Explanatory variable	CY 1973	FY 1975	CY 1973	FY 1975
BLACK	-4.16	-1.99	-0.15	-0.08
URBAN	0.60	1.00	0.09	0.18
EDUCATION	3.81	2.78	2.75	2.25
UNEMPLOYMENT	4.27	0.28	0.30	0.02
INDUSTRIAL MIX	0.40	-1.00	0.29	-0.09
PER CAPITA INCOME	-3.83	-3.82	-1.22	-1.26
NET MIGRATION	1.90	2.03	0.01	0.02
RECRUITERS	0.68	-0.58	0.12	-0.14
QUOTA	3.82	4.07	0.56	0.83

Note first that the overall quality of the FY 1975 regression is somewhat poorer than the CY 1973 regression. (The R^2 is .88 compared to .93 for CY 1973.) This is not surprising and highlights a problem with using our data and results for policy purposes such as setting quotas or distributing recruiters. Our control variables are based on 1970 census data and therefore reflect the demographic and economic characteristics of the NRDs in April 1970. As the time period from which the recruiting data are drawn moves further away from 1970, our control variables will be less suited to correcting for economic and demographic differences among the NRDs. We suggest a solution to this problem below.

Despite this defect in our data, the FY 1975 results are quite similar to those for CY 1973. Among the control variables, the most notable difference between the two years is the insignificance of UNEMPLOYMENT in the FY 1975 regression. This is another manifestation of the problem with using 1970 data for the control variables. In terms of the business cycle, FY 1975 was very different from either CY 1973 or CY 1970.[1] If a recesion affected all areas of the country and all age groups equally, then any year's unemployment rates, by region or age group, would be proportional to any other year's. This is not the case, however, and therefore CY 1970 rates do not adequately reflect FY 1975 experience.

For the control variables that are significant for both years (BLACK, EDUCATION, PER CAPITA INCOME, and NET MIGRATION), results for the two years are very similar. The direction of effect for all these variables is the same for both years, and only for BLACK is the elasticity notably different.[2]

The effects of the policy variables are also similar for the two years. The QUOTA variable is positive and strongly significant in both years, indicating an inhibiting effect of quotas. The higher elasticity for FY 1975 suggests that the quotas had an even stronger inhibiting effect on enlistments in that year than in CY 1973. This is not surprising since recruiters came much closer to filling quotas in FY 1975 than they did in CY 1973 (see table 9, below).

TABLE 9

COMPARISON OF RECRUITING RESULTS IN CY 1973 and FY 1975

	CY 1973	FY 1975
Number of total enlistments[a]	66,258	76,939
Number of school-eligible high-school-graduate enlistments	35,767	38,238
Quota[a]	73,173	78,553
SEHSG enlistments as a percent of total enlistments	54.0%	49.7%
SEHSG enlistments as a percent of quota	48.9%	46.7%

[a]Refers to total male non-prior-service regular enlistments; excludes reenlistments, women, reservists, and other special categories.

[1]The national unemployment rate averaged 4.9 percent in both CY 1970 and CY 1973. In FY 1975 it rose from 5.5 percent in July 1974 to a peak of 8.9 percent in May 1975. See reference 9, table B-24, p. 199.
[2]See appendix A for further discussion of this latter result.

The effect of RECRUITERS in FY 1975 is negative, indicating a *negative* marginal product of recruiters. This is not a particularly credible result, but in any event, the FY 1975 results do not contradict our earlier conclusion that the marginal effect of recruiters is quite low.

All things considered, then, the results from the two years look remarkably similar. We say "remarkably" because there are a number of reasons why the two years should not be so similar. First, eighteen months separate the two periods and the recruiting environment could have changed significantly in that length of time: FY 1975 is eighteen months further away from the April 1970 date on which the control variables are based; the recruiting force should have become more effective; and the business cycle was in a significantly different phase in FY 1975. Second, recruiting requirements and results differed between the two periods: quotas were higher in FY 1975 and significantly more recruits were enlisted in FY 1975. Table 9 summarizes these latter differences. Third, there were several changes in Recruiting Command administrative policy that could have led to significant changes in the relation between the number of enlistments and our policy variables. (These policy changes are discussed at length, below.)

A comparison of the log-interaction results for CY 1973 and FY 1975 does not tell a different story. Table 10 compares the "best" regression results for CY 1973 and FY 1975. The control variables that are common to both regressions (BLACK, EDUCATION, PER CAPITA INCOME, and NET MIGRATION) all have the same direction of effect and two of them (PER CAPITAL INCOME and NET MIGRATION) have virtually identical elasticities. The policy variables (RECRUITERS and QUOTA) also have similar effects in the two years. Table 11 compares the estimates of marginal and average product for the two years. The estimated marginal product of recruiters (for the "average" NRD) is slightly higher for FY 1975 than for CY 1973.[1]

In short, though there are some important differences between our results for CY 1973 and FY 1975, the basic applicability of our methodology is not restricted to any one year. (The next section of this report discusses applications of our results and methodology, and considers how their shortcomings may be remedied.)

In addition to this comparison between CY 1973 and FY 1975, our FY 1975 results can be used to evaluate the effect of two Recruiting Command policy changes since CY 1973. The first of these has been mentioned in the discussion of our data. In CY 1973, the number of recruiters assigned to each NRD was set by the Recruiting Command. In FY 1975, each district commander was assigned a total number of personnel which he was then free to distribute, within limits, between the recruiting and support functions. Since, at least for the recruiters' screening function, support personnel may be good substitutes for the active recruiters, total personnel may be a more accurate measure of recruiting strength. Thus, it can be argued that the RECRUITERS variable should reflect total personnel rather than the number of recruiters. We had no such measure for CY 1973, but for FY 1975 we had figures for total personnel as well as the number of recruiters in each NRD. For FY 1975 we also had a third measure, "factored" canvassers, which is the number of recruiters in a NRD weighted by the time on the job.

[1] Unlike the logit regression for FY 1975, the log-interaction regression yields a *positive* effect for recruiters. This difference is due to the difference between the two functional forms. The log-interaction form constrains the effect of recruiters to be positive, the logit form does not.

TABLE 10

COMPARISON OF CY 1973 AND FY 1975 "BEST" REGRESSION RESULTS, LOG-INTERACTION ENLISTMENT MODEL, SCHOOL-ELIGIBLE HIGH SCHOOL GRADUATES

	t-value		Elasticity	
Explanatory variables	CY 1973	FY 1975	CY 1973	FY 1975
BLACK	-3.68	-1.84	-0.14	-0.08
URBAN	*	1.77	*	0.31
EDUCATION	4.02	2.03	3.05	1.66
UNEMPLOYMENT	4.19	*	0.32	*
INDUSTRIAL MIX	*	-1.22	*	-0.09
PER CAPITA INCOME	-4.16	-3.21	-1.12	-1.14
NET MIGRATION	1.94	1.32	0.01	0.01
RECRUITERS			0.22	0.22
QUOTA			0.48	0.63

	CY 1973	FY 1975
n	41	43
$\bar{R}^2$	.90	.84
F	559.8	431.5

*Does not enter regression because variable does not increase $\bar{R}^2$.

TABLE 11

COMPARISON OF RECRUITING PRODUCTIVITY, CY 1973 and FY 1975

	CY 1973	FY 1975
For school-eligible high-school-graduate enlistments		
Marginal product of recruiters	2.20	2.35
Average product of recruiters	9.96	10.51
Marginal effect of quotas	0.24	0.30
For Total enlistments[a]		
Marginal product of recruiters	4.09	4.73
Average product of recruiters	18.46	21.15
Marginal effect of quotas	0.47	0.61

[a]Refers to total male non-prior-service regular enlistments; excludes reenlistments, women, reservists, and other special categories.

To test whether these two alternative measures, total personnel and factored canvassers, better explained variations in enlistments across NRDs, we estimated the logit and log-interaction enlistment models using these alternatives as our RECRUITERS variables. The regression results were invariant

with respect to the definition of the RECRUITERS variable. That is, the coefficients on the other explanatory variables, and the regression statistics, were totally unaffected by the choice of the RECRUITERS variable. The RECRUITERS variable itself had exactly the same effect, regardless of definition. In sum, total personnel or factored canvassers convey no information not contained in the total number of recruiters. This probably is due to essentially identical recruiter turnover patterns and ratios of recruiting to support personnel across NRDs.

A more important policy change involved the specification of the quotas. During FY 1975 the Recruiting Command began giving the NRDs detailed qualitative goals as well as quantitative quotas. This quality specification was based on the following four-way classification of recruits:

Group A – School-Eligible High-School Graduates
Group B – School-Eligible Non-High-School Graduates
Group C – Non-School-Eligible High-School Graduates
Group D – Non-School-Eligible Non-High-School Graduates

The quality requirements were usually specified in terms of a maximum number of Group C or D recruits that could be accepted for every 10 Group A and B enlistments.

There are two possible ways this policy change might have affected the behavior of recruiters. Because this policy change made the Navy's desire for "high-quality" recruits (that is, Group A and B recruits) more explicit, it may have increased the recruiters' efforts to enlist more SEHSGs (Group A recruits). If so, this would weaken the relation between SEHSG enlistments and QUOTA. In the limit, since no NRD enlists only SEHSGs and NRDs differ in the extent to which SEHSGs can be enlisted, the effect of QUOTA would be zero, and the number of SEHSG enlistments in a NRD would be maximized. This is, of course, the effect the Recruiting Command hoped would result.

On the other hand, this policy change could have had just the opposite effect. Since quotas are allocated largely on the basis of the pool of 17- to 21-year-old males, some NRDs would find it quite difficult to meet both the quantitative and qualitative goals, while others would find it quite easy. Recruiters in the first group of NRDs (where quotas are "too high," holding other characteristics of the NRD constant, to satisfy both the qualitative and quantitative goals) would work harder to meet their goals, while recruiters in the second group (where quotas are "too low") could meet their goals without fully exploiting the enlistment potential of the NRD. If true, this would lead to a strong positive relation between the QUOTA variable and the number of SEHSG enlistments, holding other characteristics of the NRDs constant.

As we have already noted, we do, in fact, find a strong positive relation between the QUOTA variable and the number of SEHSG enlistments. This means that if the first possible effect (that qualitative goals increase the number of SEHSG enlistments) has been at all realized, it has not been sufficient to offset the second effect – that quotas inhibit the productivity of recruiters.

Setting explicit qualitative quotas has not, then, had the desired effect (at least not to the extent desired). This is most probably because the qualitative goals do not vary across NRDs. To

successfully offset the inhibiting effects of quotas, the quality requirements should reflect the enlistment potential of the NRD in terms of SEHSGs (or some other quality measure). Currently, they do not, but instead are the same for all NRDs. We believe work of the sort presented here can be used to set NRD-specific quality requirements.

SUMMARY

Our results, based on CY 1973 and FY 1975 recruiting experience, tell a consistent story. A few control variables, together with appropriate policy variables, explain the large majority (about 90 percent) of the variation in enlistments across NRDs. In terms of predicting SEHSG enlistments, the control variables which are the most reliable predictors are the percent black population in a district and the average educational attainment and per capita income of the district population.

At the margin, the number of recruiters in a NRD has a very small effect on the number of enlistments: the marginal product of recruiters is low, and diminishes with increases in the number of recruiters. Our best point estimates suggest that the marginal product of recruiters is around 2.0 SEHSG enlistments per year. This does not mean that recruiters have no effect on enlistments. However, it does mean that modest changes in the number of recruiters would have little or no effect on the number of enlistments.

The district quota is positively and significantly related to the number of enlistments in a NRD. This is true for total enlistments, which is not surprising, but also for SEHSG enlistments. We interpret this result, and others, as evidence that effective quotas inhibit the productivity of recruiters and limit the number of enlistments in a NRD.

All these results are generally consistent across the two years we studied. They are also unaffected by the functional form used for estimating the relation between the number of enlistments and the characteristics of the NRD.

CONCLUSIONS AND RECOMMENDATIONS

As we noted earlier, we consider our qualitative conclusions most reliable. They are, first, that recruiters have a very low *marginal* effect on the number of enlistments, and second, that effective quotas inhibit the productivity of recruiters and limit the number of enlistments.

Our conclusion about the marginal effect of recruiters has several implications. Because the marginal product of recruiters is so low, reallocating recruiters across NRDs in order to equalize their marginal product would not greatly affect the number of enlistments. Also, this low marginal product of recruiters implies that modest reductions in the number of recruiters would have little effect on the Navy's ability to recruit, in terms of either quality or quantity. This implication has particular importance today because the Congress has expressed the desire to reduce the services' recruiting forces. Our results suggest that this would not greatly impair the services' recruiting efforts. Indeed, for the Navy in CY 1973, using the results in table 4, we calculated that a 20 percent reduction in the recruiter force would have resulted in only a five percent reduction in the number of SEHSG enlistments.

Our finding that the marginal product of recruiters is so low also has implications about the functions of recruiters. Their low marginal product may imply that their "sales" or information-delivery function is a relatively unproductive one. That is, the majority of the recruiters' time may be spent screening potential enlistees rather than "selling" them a Navy career.[1] This, in turn, suggests that more efficient screening devices (for example, that suggested in reference 1) would free more time for information delivery and hence increase enlistments, or, alternatively, allow a smaller recruiter force to produce the same number of enlistments.

Our other principal qualitative conclusion – that effective quotas inhibit the productivity of recruiters and reduce the number of enlistments – implies that some alternative to quotas would be desirable. Unfortunately, no useful alternative presents itself. The Navy must maintain control over the total number of enlistments, and a quota is the most obvious technique for doing so. We have argued that, given the existence of quotas, setting quality requirements separately for each NRD should significantly reduce the inhibiting effect of the quota. Analysis like that presented here could be used for that purpose.

Before turning to this and other possible applications of our work, let us emphasize that we consider our work, among other things, a demonstration. It is a demonstration that a very few explanatory variables are sufficient to predict, with reasonable accuracy, the number of enlistments from a NRD. It is a particularly persuasive demonstration because the data we have used are not the best available.

As we have already noted, the principal shortcoming of our data is that they are ultimately derived from the 1970 Census of Population. They are thus best suited to analyzing recruiting in 1970; and, as the period of analysis is further away from 1970 our data are less accurate and relevant. But that is not their only defect. Some of the individual variables themselves are seriously flawed. For

[1] This inference from our results was confirmed by conversations one of us had with active recruiters in May 1973. These informal interviews were conducted as part of an earlier CNA study of Navy recruiting. That study, using time-series rather than cross-section data of the sort used here, also found little marginal effect on enlistments due to increases in the number of recruiters. See reference 10.

example, our estimates of the pool of 17- to 21-year-old males does not account for possible regional differences in the age distribution of the total population. The UNEMPLOYMENT variable is simply the rate for the *total* civilian labor force, rather than a rate that more closely approximates the unemployment rate for the pool of eligibles, the 17- to 21-year-old males. Also, our dependent variables are all based on the number of regular male non-prior-service enlistments, which underestimates the workload of recruiters and also, because it does not include reserve enlistments, underestimates the extent to which the Navy draws on the pool of eligibles.

In short, our data are not the most desirable. Fortunately, better data can be obtained, though not cheaply, from the public use tapes of the Current Population Survey administered by the Bureau of the Census. These data are currently being used to produce estimates of the eligible pool for the Army Recruiting Command. The Department of Defense is considering acquiring this data set, along with the computer programs for processing it. We strongly recommend that such acquisition be made, and that the data be *directly accessible* by each of the services' recruiting officers.

Availability of this data would enable each of the services to make accurate estimates of the pool of eligibles. This is not currently possible. Because this data set also includes demographic and economic characteristics, it could also be used to easily perform regression analysis of the sort presented here. Such analysis would be more accurate than ours because of the greater accuracy and currency of the data.

How then can our analysis, or similar work based on better data, be used? First, of course, it could be used to reallocate recruiters to equalize their marginal products and thereby maximize total enlistments. We do not believe this would be a particularly rewarding exercise, though, given the low marginal product of recruiters. In light of the inhibiting effect of quotas, a more useful application would use our work to set quotas.

The most mechanical technique for setting quotas would merely allocate quotas across NRDs to equalize the marginal effect of quotas on the number of SEHSG enlistments (or some other quality measure). This would maximize the number of SEHSG enlistments. However, it might create other problems. The NRDs differ greatly in their potential to produce SEHSG enlistments relative to their ability to produce *total* enlistments. This mechanical technique would assign high total quotas to NRDs with high potential for SEHSG enlistments and low quotas to NRDs with low potential. But NRDs with low potential (and hence, low quotas) may be NRDs with a very large pool of eligibles or an otherwise large potential for producing total enlistments. Thus, setting quotas to maximize SEHSG enlistments might result in a failure to meet *total* enlistment objectives.

An example may serve to put this problem in better focus. In CY 1973, the New York district attained 100.9 percent of its quota, but only 35.6 percent of its enlistments were SEHSGs (the Navy total was 54.0 percent). The regression presented in table 4 implied that the marginal effect of the quota on SEHSG enlistments in the New York NRD was 0.12. This was half the average for all districts (0.24) and was the lowest among all 41 NRDs, suggesting that New York, of all the NRDs, came closest to exploiting its potential for recruiting SEHSGs. Had quotas been allocated to maximize SEHSG enlistments in CY 1973, the New York quotas would have been only slightly more than half the actual quota. Yet the regression predicts it would have recruited only about 20 percent fewer SEHSG enlistments with this lower quota. This reduction in SEHSG enlistments would have been

offset in other NRDs where quotas would have been higher (to elicit more SEHSG enlistments), but it is possible that the loss in total enlistments might *not* have been offset.

We have suggested earlier that the most direct way to avoid this problem would be to give the NRDs different quality requirements. Total quotas could be set, as they are now, roughly on the basis of the size of the eligible pool. Better yet, quotas could be based on the results of a total enlistment regression analogous to the one in table 4. Then, each NRD could be given a minimum quality requirement based on the results of a SEHSG enlistment regression. Under such a system, New York would have been given a quality requirement in CY 1973 of, say, 35 or 40 percent SEHSGs, while other NRDs would have been required to enlist as much as 80 or 90 percent SEHSGs.

This procedure is not as great a departure from current Navy policy as it may seem at first glance. Currently, quotas are assigned largely on the basis of the number of "qualified military availables" (QMA) in a district. The QMA number, in turn, is based on an estimate of the number of individuals in the eligible pool of 17- to 21-year-old males who can be expected to meet *minimum* Navy physical and mental requirements. Thus quotas are already based on the expected number of eligibles who would qualify for enlistment. Our recommendation simply goes one step further. It says that not only should the total quota be based on the quality mix of the eligible pool, but so should the required quality mix of the actual enlistees.

Setting quotas in this fashion requires, of course, that the Navy have easy, automated access to the data on the population and its characteristics for each NRD. This is the reason for our strong argument in favor of acquiring current data from the Bureau of the Census.

As time passes, estimating QMA using current methods will become increasingly difficult. The estimation of QMA in a geographical area is currently a two-step process. First, the pool of 17- to 21-year-old males ("military available," or MA) is estimated. This number is then multiplied by the fraction of MA that will meet minimum physical and mental standards for enlistment in the military services. The result is QMA. There is no way of knowing, of course, what this fraction is without relying on past experience. Currently the fraction is based on the pass rate of those individuals examined at the Armed Forces Entrance and Examining Stations (AFEES) in 1972. As we move further away from 1972 this pass rate should have less relevance for the current population. Further, it is not obvious that the 1972 pass rate is an unbiased estimate of the true fraction of the population that meets minimum standards. The rationale for using the 1972 figure rests with the fact that 1972 was a draft year in which the lottery was used. Hence, examinees at the AFEES should represent a random sample of the eligible pool. But, because 1972 was a draft year, many examinees had an incentive to fail the test, by, for example, exaggerating or misrepresenting physical disabilities. To what extent acceptable individuals were able to fail their tests is, of course, unknown.

Since examinees at the AFEES no longer represent a random sample of the eligible population, if they ever did, using more recent pass rates would not solve the problem. However, setting quotas on the basis of the results of regression analysis is an excellent substitute for setting them on the basis of QMA. It is, in fact, better, since the regression results will reflect not only the eligible individuals' ability to meet given quality standards, but also their enlistment propensity.

To summarize this discussion of quota-setting, we recommend that the Navy set quotas on the basis of analysis such as that presented here. Doing so will require direct Navy access to population and other data for the individual NRDs. Access to such data will also permit setting quotas by quality group for each NRD. We recommend that this be done, so that the inhibiting effects of quotas are minimized.

Even if qualitative goals are not varied across NRDs, regression results like those in table 4 can still be useful. For each district, the difference between the actual number of enlistments and the number predicted by the regression may convey valuable information. A positive difference implies that a NRD achieved more enlistments than would be expected on the basis of the characteristics of the NRD and Navy policy (the explanatory variables in table 1). A negative difference means enlistments were fewer than expected. It is tempting to view those NRDs with large positive differences as NRDs with "good" performance and to view those with negative differences as NRDs with "bad" performance. However, differences between actual and predicted enlistments can arise for several reasons. One of these is, of course, poor performance or productivity by the personnel in the district. However, such differences may also be due to misspecification of the regression model – such as the wrong functional form or omitted explanatory variables – or simply random fluctuations. For this reason, differences between actual and predicted enlistments should be thought of as evidence that the regression is not reflecting some influences on enlistments. For a NRD with a large deviation from predicted enlistments, a more detailed examination of the circumstances in that NRD may reveal what is causing the deviation. Factors which the regression does not include, such as management techniques or quality of the recruiters, may explain these discrepancies.

SUMMARY

Our conclusions and recommendations can be summarized as follows:

(1) Recruiters have a small effect on the number of enlistments, at the margin.
(2) Effective quotas inhibit the productivity of recruiters and reduce the number of enlistments, or their average quality.
(3) This inhibiting effect can be lessened or eliminated by setting different quality requirements for each NRD.
(4) Analysis of the kind presented here should be used to set quantitative and qualitative quotas. This requires Navy access to data on the population and its demographic and economic characteristics for each NRD.
(5) Insights into recruiting problems can be gained by examining the difference between actual and predicted enlistments for each NRD.

REFERENCES

1. Center for Naval Analyses, Study 1068, "Chances of Surviving the First Year of Service," by Robert F. Lockman, Unclassified Nov 1975.
2. U.S. Bureau of the Census, *County and City Data Book, 1972*, U.S. Government Printing Office, Washington, D.C., 1973.
3. Gray, Burton C., "Supply of First-Term Military Enlistees," in *Studies Prepared for the President's Commission on All-Volunteer Armed Force*, U.S. Government Printing Office, Washington, D.C. 1970.
4. Fechter, Alan, "Impact of Pay and Draft Policy on Army Enlistment Behavior," in *Studies Prepared for the President's Commission on All-Volunteer Armed Force*, U.S. Government Printing Office, Washington, D.C., 1970.
5. Cook, Alvin A., Jr., "Supply of Air Force Volunteers," in *Studies Prepared for the President's Commission on All-Volunteer Armed Force*, U.S. Government Printing Office, Washington, D.C., 1970.
6. Cook, Alvin A., Jr. and John P. White, "Estimating the Quality of Airmen Recruits," in *Studies Prepared for the President's Commission on All-Volunteer Armed Force*, U.S. Government Printing Office, Washington, D.C., 1970.
7. Johnston, J., *Econometric Methods*, McGraw-Hill, New York, 1963.
8. Berkson, J., "Maximum Likelihood and Minimum Chi-Square Estimates of the Logistic Function," *Journal of the American Statistical Association*, Vol. 50, 1955, pp. 130-162.
9. *Economic Report of the President*, January 1976, U.S. Government Printing Office, Washington, D.C., 1976.
10. Center for Naval Analyses, Research Contribution 235, "Navy Recruiting in an All-Volunteer Environment," by Christopher Jehn and LCDR Hugh E. Carroll, USN, Unclassified Jul 1973.
11. Center for Naval Analyses, Study 1039, "Enlisted Selection Strategies," by Robert F. Lockman, Unclassified 1974.
12. Center for Naval Analyses, Study 1056, "Marine Corps Enlistment Guarantee Study," by C. Bernard Barfoot, William H. Sims, and Steven W. Klein, Unclassified Apr 1975.

APPENDIX A

THE DETERMINANTS OF BLACK ENLISTMENTS

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The regression results in the text consistently show that the percentage of blacks in a district is an important predictor of the number of enlistments. In particular, the higher the percent of blacks (the control variable BLACK) in a district, the lower the number of enlistments, other things equal. There are several possible explanations for this, and this appendix represents an attempt to gain greater insight into this result.

One very important explanation for the negative effect of BLACK on the number of enlistments is the generally lower scores blacks get on Navy entrance examinations such as the Basic Test Battery (BTB).[1] In other words, for a given population, fewer blacks than whites will meet the Navy's minimum mental standards. Thus, other things equal, fewer blacks than whites will be able to enlist. This result, of course, should apply to the other services as well. But, as shown in table A-1, the Navy has enlisted far fewer blacks, in percent terms, than have the other services. This has raised another question: Do blacks have a relative distaste for the Navy, or does the Navy have, implicitly or explicitly, a distaste for blacks?

TABLE A-1

BLACK ENLISTMENTS AS A PERCENT OF TOTAL ENLISTMENTS FY 1974 AND 1975

Service	Non-prior-service male and female enlisted accessions FY 1974	FY 1975
Army	27%	23%
Navy	11	10
Marine Corps	21	19
Air Force	16	15
Total	21	18

Source: Monthly Recruiting Reports, Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs)

If blacks have a distaste for the Navy because of the Navy's reputation, deserved or not, for past discrimination, then recruiters may be most useful in dispelling this notion. To investigate this possibility, we estimated regressions analogous to that in table 3, using black SEHSG enlistments as the dependent variable.

Results for these black enlistment regressions for CY 1973 and FY 1975 are displayed in table A-2. The explanatory variables are the same as those used in the text, with one exception: BLACK

[1] In FY 1973, for example, non-caucasians scored an average of one standard deviation lower than caucasians on the BTB. See table B-5, p. B-13, reference 11. Reference 11 also discusses evidence from other sources which corroborates this fact.

TABLE A-2

REGRESSION RESULTS FOR LOGIT ENLISTMENT MODEL, BLACK SCHOOL-ELIGIBLE HIGH-SCHOOL-GRADUATE ENLISTMENTS, CY 1973 AND 1975

	CY 1973			CY 1975		
Explanatory Variable	Coefficient	t-value	Elasticity	Coefficient	t-value	Elasticity
Constant	-10.55	- 2.66		- 5.26	- 1.53	
BLACK	- 1.91	- 1.54	- 0.28	- 2.75	- 3.39	- 0.44
URBAN	- 2.17	- 2.79	- 1.52	- 0.14	- 0.24	- 0.10
EDUCATION	0.08	0.37	0.93	0.20	1.27	2.33
UNEMPLOYMENT	25.0	4.08	1.12	- 0.72	- 0.15	- 0.03
INDUSTRIAL MIX	- 1.81	- 1.43	- 0.46	- 1.00	- 1.03	- 0.26
BLACK INCOME	0.07	0.88	0.46	- 0.17	- 2.73	1.01
NET MIGRATION	- 0.02	- 0.02	- 0.00	- 1.62	- 2.58	- 0.06
RECRUITERS	388.7	2.01	0.14	-592.7	- 0.32	- 0.20
QUOTA	- 0.51	- 0.90	- 0.51	0.36	- 0.69	0.36

	CY 1973	CY 1975
n	41	42
R^2	.78	.59
F	12.1	5.0

INCOME, median black family income in each NRD, has been substituted for PER CAPITA INCOME. These are logit regressions – in other words, estimates of equation (4) for black enlistments.[1]

Looking first at the CY 1973 results, note that this regression is of lower overall quality than the analogous regression for total SEHSG enlistments shown in table 3. The R^2 is only .78 (compared to .93 for the regression in table 3) and fewer of the coefficients are significant. This is probably not surprising, though, since most of the control variables are district averages that apply more to the white population than to the black population.

This may also explain the negative, nearly significant coefficient on BLACK. We saw that EDUCATION was an important predictor of total enlistments, but it is insignificant here. We argued that EDUCATION's positive effect on all enlistments probably reflected the fact that higher levels of educational attainment were positively correlated with the likelihood of individuals meeting Navy entrance requirements. It cannot serve this control function here because it is primarily influenced by the educational attainment of the white population. Instead BLACK may be controlling for the likelihood of blacks meeting entrance requirements.[2]

In any case, we are most interested in the effects of our policy variables, RECRUITERS and QUOTA. The results here differ considerably from those for overall SEHSG enlistments (table 3). As for overall enlistments, the RECRUITER variable has a positive coefficient, but now the coefficient is significant. This suggests that recruiters are more effective "selling" the Navy to blacks than to whites. This may not be an unexpected result if blacks do, in fact, have a marked distaste for the Navy – recruiters may be a very useful tool for combatting this distaste.

Unlike the case for overall enlistments, the QUOTA variable has a negative, insignificant coefficient. This means that the size of the district quota has no effect on the number of black enlistments. This may, at first glance, appear to contradict our previous hypothesis. If recruiters can more effectively influence the enlistment decision of blacks than whites, then one might think an increase in the quota would lead to an increase in black enlistments as recruiters try to "sell" the Navy to more blacks. But recall that recruiters perform two functions: this "sales" or information-delivery function and a screening function. As quotas rise, screening should consume more of the recruiter's time, leaving less time for information delivery, and this impacts heaviest on the number of black enlistments.

Unfortunately, the FY 1975 results do not clearly support the CY 1973 results and this line of reasoning. The FY 1975 regression is considerably poorer in overall quality, and both QUOTA and RECRUITERS have insignificant coefficients. This means that neither the district quota nor the

[1] These are weighted regressions, where the weight is $\sqrt{P_i(ER_i)(1 - ER_i)}$, with P and ER referring to *black* populations and enlistment rates, respectively. The regressions in the text are unweighted. Weighting (in essence, by the population size of the NRD) is theoretically desirable, but it had little effect on the regressions in the text so we have reported unweighted results. Because the relative variance in black populations, across NRDs, is greater than that for total population, weighting had a considerable effect on the black regression. For a good discussion of weighting in this context, see reference 3, p. II-2-33.

[2] The following facts give some corroboration to this hypothesis. The four distncts with the highest percent black populations are all in the South, where average educational attainment of olacks is probably lower. Also, the simple correlation between the BLACK and EDUCATION variables is -.63.

number of recruiters had any influence on the number of black SEHSG enlistments in FY 1975 Because recruiter workloads were heavier in FY 1975 (the number of enlistments was 16.1 percent higher than in CY 1973 while there were only 1.4 percent more recruiters), this may simply reflect the fact that recruiters were able to devote less time to recruiting blacks.

The FY 1975 results are probably not the result of a dissipation of black distaste for the Navy. A Gilbert Youth Survey in May 1974 (essentially, the beginning of FY 1975 recruiting) showed a marked distaste for the Navy by blacks. Table A-3 displays these results. Only for the Navy do blacks exhibit less preference for service than do whites. Of course, blacks may have had an even stronger distaste for the Navy in CY 1973.

TABLE A-3

SERVICE PREFERENCE BY RACE, MAY 1974

Service preferred[a]	Whites	Blacks	Total
Army	19%	25%	20%
Navy	34	22	32
Air Force	36	36	36
Marine Corps	11	17	12
Total	100	100	100

[a]By those who stated they had a 40 percent or greater chance of enlisting.

Source: Derived from figures in reference 12, p. 82. Original results from Gilbert Youth Survey, May 1974.

In short, our results suggest that recruiters may be more effective selling the Navy to blacks than to whites. But, the insignificance of the QUOTA variable implies that when the workload of recruiters rises they intensify their efforts to recruit whites more than they do their efforts to recruit blacks. This is understandable, however since white SEHSGs are easier to "find" than black SEHSGs.

In any event, the negative effect of BLACK on overall enlistments is probably largely due to two factors: the lower ability of blacks to pass Navy entrance exams and a strong distaste for the Navy by blacks. Since recruiters (particularly black ones) may be the most effective way to counter this distaste, a reduction in the number of recruiters may result in a drop in the number of black enlistments, though it should have little effect on overall enlistments.

If the Navy considers the low number of black enlistments a problem, then further study of ways to increase black enlistments is merited. We have barely scratched the surface here. The solution to the problem may, for example, lie with increasing the number of black recruiters or distributing them across and within the NRDs more advantageously. Analysis like that presented here would facilitate this process. Thus, this represents another argument in favor of the Recruiting Command having access to current data on the population and its characteristics in each NRD.

APPENDIX B

DATA

TABLE B-1, CY 1973 DATA

RECRUITING DISTRICT	TOTAL ENLISTMENTS	SEHSG ENLISTMENTS	TOTAL BLACK ENLISTMENTS	SEHSG BLACK ENLISTMENTS	17-21 YR OLD POPULATION	17-21 YR OLD BLACK POPULATION	BLACK	URBAN
ALBANY	1900	1044	78	15	293346	12529	0.040	0.704
BOSTON	2058	1132	61	21	338288	8744	0.024	0.773
BUFFALO	2014	1010	104	18	240628	11298	0.044	0.677
NEW YORK	3737	1332	652	83	832293	126101	0.142	0.950
PHILADELPHIA	2057	1101	157	40	375477	49787	0.125	0.800
ATLANTA	1034	404	229	62	174875	48028	0.266	0.618
COLUMBIA	956	373	247	45	163810	44920	0.269	0.478
JACKSONVILLE	832	395	166	38	165511	35107	0.204	0.712
MEMPHIS	923	410	326	95	169313	60404	0.349	0.534
MIAMI	1112	529	82	25	175605	26312	0.141	0.868
MONTGOMERY	1191	540	287	62	163841	46783	0.277	0.681
NASHVILLE	1111	495	122	31	169481	16308	0.091	0.467
RALEIGH	1278	552	263	53	224099	53953	0.235	0.478
CLEVELAND	1822	911	158	33	259635	27801	0.101	0.805
COLUMBUS	2185	958	201	35	267666	21514	0.076	0.698
INDIANAPOLIS	1533	868	118	37	176616	10099	0.054	0.605
LOUISVILLE	1507	670	142	40	214119	14438	0.064	0.488
PITTSBURGH	1637	953	75	25	223715	10331	0.043	0.631
RICHMOND	1024	445	218	62	181421	41606	0.223	0.579
WASHINGTON	1624	857	247	63	388341	73833	0.181	0.733
CHICAGO	2638	1176	414	77	502750	73730	0.148	0.877
DETROIT	2964	1657	343	89	418289	58267	0.115	0.747
MILWAUKEE	1678	1094	91	28	197887	6465	0.031	0.677
ST. LOUIS	1745	950	103	29	239810	23673	0.093	0.653
DENVER	1632	978	43	9	136671	3575	0.025	0.738
DES MOINES	1016	643	10	4	121889	1299	0.010	0.568
FARGO	552	393	9	2	65884	135	0.002	0.377
KANSAS CITY	1321	756	76	18	176396	11406	0.061	0.687
MINNEAPOLIS	1298	829	9	2	172514	1649	0.009	0.678
OMAHA	906	563	19	3	111563	2015	0.017	0.561
ALBUQUERQUE	941	618	22	10	114778	3735	0.031	0.753
DALLAS	1452	798	352	44	204660	29682	0.139	0.785
HOUSTON	935	452	126	32	145743	30840	0.201	0.827
LITTLE ROCK	1009	506	153	40	138043	32198	0.224	0.528
NEW ORLEANS	830	386	213	77	144934	41954	0.284	0.674
OKLAHOMA CITY	1045	612	105	32	116789	8028	0.065	0.782
SAN ANTONIO	1184	586	5	26	129666	7249	0.053	0.778
LOS ANGELES	4558	3335	286	113	609198	51263	0.071	0.935
PORTLAND	1383	947	10	3	138986	1466	0.010	0.638
SAN FRANCISCO	3374	2207	121	58	487321	24846	0.049	0.825
SEATTLE	1782	1296	136	76	222846	3921	0.017	0.661

RECRUITING DISTRICT	EDUCATION	UNEMPLOYMENT	INDUSTRIAL MIX	PER CAPITA INCOME	BLACK MEDIAN FAMILY INCOME	NET MIGRATION	RECRUITERS	QUOTA
ALBANY	12.1	0.038	0.324	3478	7587	0.058	104	2159
BOSTON	12.0	0.038	0.294	3213	6845	0.619	120	2080
BUFFALO	12.1	0.045	0.336	3150	7126	-0.020	102	2149
NEW YORK	11.8	0.037	0.247	3845	7551	0.043	193	3704
PHILADELPHIA	11.7	0.037	0.333	3234	7434	0.048	134	2449
ATLANTA	10.8	0.032	0.257	2674	3171	0.091	60	1100
COLUMBIA	10.5	0.038	0.365	2315	4535	-0.039	57	995
JACKSONVILLE	11.6	0.038	0.161	2712	4411	0.182	49	860
MEMPHIS	10.9	0.049	0.258	2110	3656	-0.084	52	837
MIAMI	11.8	0.036	0.139	3285	5460	0.395	53	1141
MONTGOMERY	10.9	0.043	0.264	2212	4006	-0.045	52	1147
NASHVILLE	10.7	0.045	0.338	2496	4963	0.019	54	1137
RALEIGH	11.0	0.033	0.347	2512	4728	-0.019	70	1476
CLEVELAND	12.1	0.040	0.359	3325	7912	-0.020	96	2348
COLUMBUS	11.9	0.048	0.331	3053	7576	0.806	108	2388
INDIANAPOLIS	12.0	0.041	0.342	3074	7784	0.017	66	1675
LOUISVILLE	10.4	0.049	0.257	2410	5295	-0.864	77	1663
PITTSBURGH	11.7	0.046	0.314	2803	6261	-0.874	81	1921
RICHMOND	10.6	0.032	0.267	2602	5656	0.822	66	1113
WASHINGTON	11.8	0.030	0.203	3503	7877	0.136	94	1882
CHICAGO	12.1	0.036	0.326	3595	8010	0.807	142	3335
DETROIT	12.0	0.058	0.365	3390	8492	0.025	145	3180
MILWAUKEE	12.0	0.042	0.312	3036	7517	0.009	72	1632
ST. LOUIS	11.0	0.047	0.246	2899	6331	0.026	98	2046
DENVER	12.4	0.043	0.130	3022	7043	0.070	72	1648
DES MOINES	12.0	0.035	0.211	2918	6876	-0.025	57	1293
FARGO	11.4	0.051	0.080	2362	6298	-0.120	32	678
KANSAS CITY	12.1	0.043	0.195	2978	6689	-0.022	80	1672
MINNEAPOLIS	11.9	0.042	0.232	3110	7583	0.033	78	1654
OMAHA	12.0	0.028	0.128	2714	6412	-0.057	65	1192
ALBUQUERQUE	12.0	0.048	0.093	2545	5121	-0.148	63	986
DALLAS	11.6	0.034	0.231	2979	5313	0.104	98	1767
HOUSTON	11.6	0.032	0.206	3058	5676	0.151	58	1264
LITTLE ROCK	10.6	0.057	0.245	2152	3558	-0.849	58	1188
NEW ORLEANS	10.6	0.053	0.151	2372	4325	0.033	55	1051
OKLAHOMA CITY	11.7	0.041	0.156	2747	4868	0.062	62	1032
SAN ANTONIO	10.8	0.042	0.104	2238	4925	-0.047	58	1047
LOS ANGELES	12.4	0.059	0.209	3564	7324	0.200	258	4998
PORTLAND	12.3	0.065	0.207	3043	6798	0.064	84	1658
SAN FRANCISCO	12.4	0.062	0.151	3440	7605	0.117	182	3946
SEATTLE	12.1	0.078	0.183	3250	8180	0.055	108	1963

TABLE B-2, FY 1975 DATA

RECRUITING DISTRICT	TOTAL ENLISTMENTS	SEMSG ENLISTMENTS	TOTAL BLACK ENLISTMENTS	SEMSG BLACK ENLISTMENTS	17-21 YR OLD POPULATION	17-21 YR OLD BLACK POPULATION	BLACK	URBAN	EDUCATION
ALBANY	2435	1205	97	15	302482	13167	0.040	0.704	12.1
BOSTON	2523	1323	66	14	348625	9198	0.024	0.773	12.0
BUFFALO	2224	1045	157	13	248157	11874	0.044	0.677	12.1
HARRISBURG	1062	602	23	6	180270	3363	0.017	0.579	11.6
NEWARK	2093	836	301	30	287945	31663	0.102	0.907	11.9
NEW YORK	2784	1055	569	87	573297	100907	0.162	0.971	11.7
PHILADELPHIA	1827	824	261	48	288548	51440	0.167	0.961	11.7
ATLANTA	1269	551	246	35	181726	50477	0.266	0.618	10.8
COLUMBIA	1037	411	207	31	170244	47210	0.269	0.478	10.5
JACKSONVILLE	1062	569	178	44	171639	36897	0.204	0.712	11.6
MEMPHIS	1002	436	324	74	176422	63483	0.349	0.534	10.8
MIAMI	1412	769	73	15	181716	27654	0.141	0.860	11.8
MONTGOMERY	1508	751	301	64	170321	49168	0.277	0.601	10.8
NASHVILLE	1435	662	121	28	175074	17139	0.091	0.467	10.7
RALEIGH	1726	712	317	50	232638	56703	0.235	0.470	11.0
CLEVELAND	1993	1004	133	29	268297	29219	0.101	0.805	12.1
COLUMBUS	2441	1192	194	28	276355	22611	0.076	0.698	11.9
INDIANAPOLIS	1363	734	88	18	182207	10614	0.054	0.685	12.0
LOUISVILLE	1586	657	151	25	220975	15166	0.064	0.480	10.4
PITTSBURGH	1753	914	115	28	239708	10857	0.043	0.631	11.7
RICHMOND	1307	394	245	38	189934	43926	0.222	0.574	10.6
WASHINGTON	1898	896	308	48	319549	74037	0.221	0.794	11.9
CHICAGO	3521	1412	576	70	520228	77489	0.140	0.877	12.1
DETROIT	3186	1834	171	41	432457	52830	0.115	0.747	12.0
MILWAUKEE	1596	803	94	6	205149	6834	0.031	0.673	12.0
ST. LOUIS	1953	912	159	37	244096	24773	0.094	0.657	11.0
DENVER	1824	981	41	8	140852	3758	0.025	0.738	12.4
DES MOINES	1101	687	5	2	125551	1366	0.010	0.568	12.0
FARGO	569	363	0	0	66937	141	0.002	0.377	11.4
KANSAS CITY	1445	800	44	13	186114	12231	0.061	0.681	12.1
MINNEAPOLIS	1533	860	7	4	176534	1721	0.009	0.674	11.9
OMAHA	884	557	14	3	114943	2118	0.017	0.561	12.0
ALBUQUERQUE	1395	726	40	5	118315	3925	0.031	0.753	12.0
DALLAS	1836	967	245	32	211768	31195	0.139	0.785	11.6
HOUSTON	1325	614	217	40	151124	31571	0.201	0.927	11.6
LITTLE ROCK	1297	667	222	41	143250	33831	0.224	0.520	10.6
NEW ORLEANS	1058	364	276	33	150701	44093	0.284	0.674	10.6
OKLAHOMA CITY	1238	604	116	31	120450	8429	0.065	0.702	11.7
SAN ANTONIO	1606	833	83	10	133767	7618	0.053	0.778	10.8
LOS ANGELES	4901	2672	295	63	694903	52624	0.071	0.938	12.4
PORTLAND	1536	943	6	1	143078	1548	0.010	0.638	12.3
SAN FRANCISCO	3717	1960	111	27	519398	27527	0.050	0.824	12.4
SEATTLE	1878	1177	22	6	229598	4121	0.017	0.661	12.1

RECRUITING DISTRICT	UNEMPLOYMENT	INDUSTRIAL MIX	PER CAPITA INCOME	BLACK MEDIAN FAMILY INCOME	NET MIGRATION	RECRUITERS	'FACTORED' RECRUITERS	TOTAL PERSONNEL	QUOTA
ALBANY	0.038	0.324	3478	7587	0.050	107	87	155	2314
BOSTON	0.039	0.294	3213	6845	0.019	111	85	158	2262
BUFFALO	0.045	0.336	3150	7126	-0.020	104	80	143	2373
HARRISBURG	0.032	0.387	2892	6731	0.018	61	47	91	1313
NEWARK	0.036	0.322	3784	7974	0.099	77	59	104	1670
NEW YORK	0.038	0.209	3876	7419	0.015	103	83	148	2444
PHILADELPHIA	0.037	0.295	3374	7445	0.049	85	65	122	1968
ATLANTA	0.032	0.257	2674	3171	0.091	68	49	91	1154
COLUMBIA	0.038	0.365	2315	4535	-0.039	53	40	82	931
JACKSONVILLE	0.038	0.161	2712	4411	0.182	51	41	81	919
MEMPHIS	0.049	0.258	2110	3656	-0.084	52	41	83	850
MIAMI	0.036	0.139	3285	5460	0.395	59	48	88	1260
MONTGOMERY	0.043	0.264	2212	4006	-0.045	56	46	86	1276
NASHVILLE	0.045	0.338	2496	4963	0.019	56	43	85	1293
RALEIGH	0.033	0.347	2512	4728	-0.019	74	60	101	1596
CLEVELAND	0.040	0.359	3325	7912	-0.020	108	86	154	2552
COLUMBUS	0.040	0.331	3053	7576	0.006	102	79	154	2427
INDIANAPOLIS	0.041	0.342	3074	7784	0.017	64	48	97	1591
LOUISVILLE	0.049	0.257	2410	5295	-0.064	75	61	113	1670
PITTSBURGH	0.046	0.314	2803	6261	-0.074	89	70	125	1942
RICHMOND	0.032	0.266	2601	5655	0.023	60	47	91	1071
WASHINGTON	0.031	0.167	3652	7923	0.165	92	75	130	1832
CHICAGO	0.036	0.326	3595	8010	0.007	170	132	222	3879
DETROIT	0.058	0.365	3390	8492	0.025	132	99	182	3337
MILWAUKEE	0.042	0.312	3032	7517	0.009	7[illegible]	56	112	1611
ST. LOUIS	0.047	0.247	2907	6342	0.027	94	75	139	2219
DENVER	0.043	0.130	3022	7043	0.070	71	55	104	1898
DES MOINES	0.035	0.211	2818	6876	-0.025	65	49	93	1136
FARGO	0.051	0.080	2362	6298	-0.120	34	24	52	649
KANSAS CITY	0.043	0.195	2958	6661	-0.022	79	60	111	1747
MINNEAPOLIS	0.042	0.232	3129	7583	0.034	80	63	113	1797
OMAHA	0.028	0.128	2714	6412	-0.057	61	47	94	1039
ALBUQUERQUE	0.048	0.093	2545	5121	-0.148	56	45	90	1191
DALLAS	0.034	0.231	2979	5313	0.104	88	68	115	1772
HOUSTON	0.032	0.206	3058	5676	0.151	60	48	90	1281
LITTLE ROCK	0.057	0.245	2152	3558	-0.049	56	47	82	1172
NEW ORLEANS	0.053	0.151	2372	4325	0.033	57	45	85	935
OKLAHOMA CITY	0.041	0.156	2747	4860	0.062	59	47	82	1188
SAN ANTONIO	0.042	0.104	2288	4925	-0.047	61	45	88	1191
LOS ANGELES	0.059	0.212	3592	7373	0.205	265	204	363	5613
PORTLAND	0.065	0.207	3043	6798	0.064	88	63	138	1849
SAN FRANCISCO	0.063	0.158	3420	7501	0.112	198	141	279	4009
SEATTLE	0.078	0.183	3250	8180	0.055	107	82	166	2132